

AE 451A: Experiments in Aerospace Engineering

(2021-22, I Semester)

Instructors:

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Class timings: Monday 2:00 PM-4:50 PM

Venue: ONLINE VIA ZOOM (DETAILS ALREADY SHARED)

Course Description:

This course consists of a series of experiments in Aerodynamics, Propulsion and Structures. The details of the experiments are:

Structures: Week 1 to Week 4

1. Impact test to measure fracture energy of materials.
2. Full-field stress analysis using photo-elasticity
3. Mechanical Characterization of soft materials
4. Vibration characteristics of a slender beam.

Aerodynamics: Week 5 to Week 8

1. Laminar and turbulent boundary layer characteristics over a flat plat.
2. (a) Measurement of mean and fluctuating velocity component profile in the turbulent wake behind a circular cylinder.
(b) Study the dependence of vortex shedding frequency in the Karman vortex street of a circular cylinder on Reynolds number.
3. Studies on subsonic jet propagation
4. Aerodynamic forces and moments on a generic aircraft model

Propulsion: Week 9 to Week 12

1. Performance Comparison of Straight and Curved Diffusers
2. Performance Analysis of a Turbojet Engine
3. Performance Analysis of a Two Stage Axial Fan
4. Performance Analysis of a Two-Shaft Gas Turbine Engine

Assessment:

Assessment will be based on the following activities

| Assessment Activity | % Weightage |
|----------------------------|--------------------|
| Laboratory Reports | 40 |
| Quizzes | 40 |
| Final Exam | 20 |